

OCT 29 2007

PAGE 14/21 \* RCVD AT 10/29/2007 5:10:23 PM [Eastern Daylight Time] \* SVR:USPTO-EFAXRF-1/4 \* DNIS:2738300 \* CSID:847 578 4095 \* DURATION (mm-ss):08-26

Docket No. GL-6115DIV

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant(s): Shiping WANG et al. Confirmation No.: 6669  
Serial No.: 10/788,954 Group Art Unit: 1772  
Filed: March 1, 2004 Examiner: Walter Augenbaugh  
For: POLYISOPRENE ARTICLES AND PROCESS FOR MAKING SAME

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**DECLARATION OF SHIPING WANG UNDER 37 C.F.R. §1.132**

I, Shiping Wang, hereby declare that:

1. I hold the position of Technical Consultant/Senior Engineering Specialist in the Applied Technology Center of Cardinal Health. I have held this position since 1996. In this position, I manage technical resources to develop medical operating room devices such as gloves (exam/surgical), skin prep, and non-woven laminates. In this position, I regularly study and use latex/dispersion coating formulations, skin care preparations, hot-melt formulations, and elastomer/rubber latex compounding.

2. I received a Doctor of Philosophy degree from the Material Science-Polymer Program at the Institute of Material Science at the University of Connecticut. My research there focused on the chemical modification of the polymer interface in multicomponent systems. I received a Master of Science degree in Polymer Chemistry and Physics from the Department of Material Science at China Textile University, and a Bachelors degree in Biochemistry from Peking University.

3. From 1990 to 1992, I was a Research Associate (Post-doctoral fellow) at the Emulsion Polymer Institute of Lehigh University. At Lehigh University, I

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worked on the synthesis and modification of acrylic copolymers through emulsion techniques.

4. From 1992 to 1994, I held the position of Senior Research Chemist in the Emulsion Polymer Laboratory of Witco Corporation. At Witco Corporation, I studied surfactant application in emulsion polymerization and their effect on latex properties.

5. From 1994 to 1996, I held the position of Senior Research Associate in the New Technology group at Dexter Corporation. At Dexter Corporation, I was involved in the development of emulsion/dispersion polymers and coating formulations for can coatings, and solvent-based industrial coating resins.

6. I am familiar with the skills and knowledge of one of ordinary skill in the art of biochemistry, polymer chemistry, polymer physics, material engineering, and colloidal chemistry.

7. I am a co-inventor of the subject matter of the above-identified patent application, and I assisted with the preparation of the application. I have reviewed the above-identified patent application, and I am familiar with its contents. I have also reviewed all the correspondence between the applicants and the United States Patent & Trademark Office ("USPTO"), and I am familiar with their contents.

8. Those of ordinary skill in the art of polymer chemistry at the time of the filing of the above-identified application would have understood that the term "polyisoprene latex" means a latex composition made of the polymer "polyisoprene." Those of ordinary skill in the art of polymer chemistry also understand that "polyisoprene" is a homopolymer of isoprene, prepared by polymerizing isoprene alone. This is in stark contrast to copolymers of isoprene, which are prepared by polymerizing together isoprene and at least one other monomer.

9. The understanding of one of ordinary skill in the art of polymer chemistry at the time of the filing of the above-identified application is further

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corroborated by the entry for "polyisoprene" found in the *Aldrich Handbook of Fine Chemicals* [Exhibit A], as well as the definition of "polyisoprene" found in *Polymer Science Dictionary, Second Edition*, Ed. Mark Alger, 1989 [Exhibit B], which reads, in relevant part:

**Polyisoprene** (*poly-(2-methyl-1,3-butadiene)*)  
A polymer of isoprene which can exist in any of  
several stereoisomeric forms.

10. There is no statement either in the specification or the prosecution of the above-referenced application that would suggest that any meaning other than the ordinary and accustomed meaning in the art should be attributed to the term "polyisoprene latex."

11. I further declare under penalty of perjury that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful statements may jeopardize the validity of the application or any patents issued thereon.

Oct. 24, 2007

Date

Shing Wang

Shing Wang

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**Exhibit A**

**■ Polyisobutylmet ■**

**Poly(isobutyl methacrylate)**

19011-15-88  $(C_{12}H_{20}O_2)_n$

TSCA

► average  $M_w$  ~70,000, crystalline

$T_g$	55 °C
solubility	insoluble
density	0.91 g/mL, 25 °C
viscosity	1.477
181544-50G	poly br 50 g 18.70
181544-250G	poly br 250 g 30.70
181544-500G	poly br 500 g 61.50

► average  $M_w$  ~130,000

reduced viscosity 35-45 (mL/g) (20 °C, CHCl<sub>3</sub>)

$T_g$	65 °C
density	0.95 g/mL, 25 °C
viscosity	1.105 g/mL, 25 °C
445754-50G	poly br 50 g 27.90
445754-250G	poly br 250 g 49.90
445754-500G	poly br 500 g 73.90

► average  $M_w$  300,000 (typical), average  $M_n$  140,000 (typical), crystalline, secondary standard

181552-5G	glass br 5 g 29.00
181552-25G	glass br 25 g 117.00

**Poly(isobutyl vinyl ether) solution**

(5002-2A-5)  $(C_4H_8O)_n$

60 wt. % in naphtha

$T_g$	10-140 °C
density	0.8 g/mL, 25 °C
viscosity	0.25-2.5 cP, 25 °C
479241-100ML	glass br 100 mL 37.40
479241-250ML	glass br 250 mL 67.40

**Poly(isophorone diisocyanate) solution**

153810-05-01

70 wt. % in propylene glycol methyl ether acetate/xylene (1:1)

$T_g$	140 °C
density	1.06 g/mL, 25 °C
viscosity	1.0-2.0 cP, 25 °C
418048-250ML	glass br 250 mL 37.60
418048-1L	glass br 1 L 154.00

**Polyisoprene, cis**

1164389-31-3  $(C_5H_8)_n$

► average  $M_w$  ~38,000 by GPC, made from natural rubber  
Non-fugitive, reactive plasticizer, rheology modifier for lubricants, reactive binder

viscosity	150 poise (37 °C, Brookfield/BL)
unsaturation	98 mole %
density	0.92 g/mL, 25 °C
$T_g$	112 °C (25 °C)
431257-100G	glass br 100 g 39.10
431257-250G	glass br 250 g 66.00

► average  $M_w$  ~40,000 by GPC, made from synthetic rubber  
Non-fugitive, reactive plasticizer, rheology modifier for lubricants, reactive binder

viscosity	400 poise (37 °C, Brookfield/BL)
unsaturation	92 mole %
density	0.92 g/mL, 25 °C
$T_g$	112 °C (25 °C)
431265-100G	glass br 100 g 48.00
431265-250G	glass br 250 g 78.00

**► 97% cis-1,4**

solubility	insoluble
$T_g$	67 °C
density	0.91 g/mL, 25 °C
viscosity	1.5191
182141-100G	poly br 100 g 69.10
182141-250G	poly br 250 g 163.00

**Polyisoprene, trans**

1164389-32-4  $(C_5H_8)_n$

$T_g$	66 °C
density	0.905 g/mL, 25 °C

**pellets, 99+ % trans-1,4**

182168-10G	poly br 10 g 21.00
182168-50G	poly br 50 g 72.10
182168-100G	poly br 100 g 123.00

**Polyisoprene, chlorinated**

168441-55-7  $(C_5H_7Cl)_n$

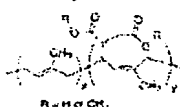
462527-100G	poly br 100 g 51.10
462527-250G	poly br 250 g 129.00

► Polyisoprene, hydrogenated, w/ Polyisobutylene-*g*-styrene, multi

and Resin 6354

**Polyisoprene-graft-maleic acid monomethyl ester**

1122009-05-65



density	0.92 g/mL, 25 °C
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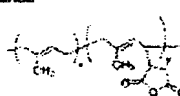
average  $M_w$  ~25,000

Co-soluble plasticizer. Adhesive additive.  
viscosity 25-40 cP, 20 wt. % in toluene (30 °C, Brookfield/BL)

459054-250ML	glass br 250 mL 30.50
459054-1L	glass br 1 L 85.00

**Polyisoprene-graft-maleic anhydride**

113901A-75-71



density	0.92 g/mL, 25 °C
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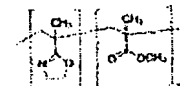
average  $M_w$  ~25,000

Co-soluble plasticizer. Adhesive additive.  
viscosity 10-50 cP, 20 wt. % in toluene (30 °C, Brookfield/BL)

460060-250ML	glass br 250 mL 30.50
460060-1L	glass br 1 L 84.00

**Poly(2-isopropenyl-2-oxazoline-co-methyl methacrylate)**

27381-60-2



Water soluble cross-linking agent for carboxyl containing polymers.  
 $T_g$  160 °C

2040

For additional product information, visit sigma-aldrich.com

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**Exhibit B**

**Polymer Science  
Dictionary**

Second edition

**Mark Alger**

*School of Polymer Technology  
University of North London  
London, UK*



**CHAPMAN & HALL**

London · Weinheim · New York · Tokyo · Melbourne · Madras

Serial No. 10/788.954

Docket No. GL-6115DIV

Published by Chapman & Hall, 2-6 Boundary Row, London SE1 8HN, UK

Chapman & Hall, 2-6 Boundary Row, London SE1 8HN, UK

Chapman & Hall GmbH, Pappelallee 3, 69469 Weinheim, Germany

Chapman & Hall USA, 115 Fifth Avenue, New York, NY 10003, USA

Chapman & Hall Japan, ITP-Japan, Kyowa Building, 3F,  
2-2-1 Hirakawacho, Chiyoda-ku, Tokyo 102, Japan

Chapman & Hall Australia, 102 Dodds Street, South Melbourne,  
Victoria 3205, Australia

Chapman & Hall India, R. Seshadri, 32 Second Main Road, CIT East,  
Madras 600 035, India

First edition 1989

Reprinted 1990

Second edition 1997

© 1989 Chapman & Hall, 1997 Mark Alger

Typeset in 10/12 pt Times by Academic & Technical Typesetting, Bristol  
Printed in Great Britain by T.J. International Ltd, Padstow, Cornwall

ISBN 0 412 60870 7

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A catalogue record for this book is available from the British Library

Library of Congress Catalog Card Number: 96-86111

♾ Printed on acid-free text paper, manufactured in accordance with  
ANSI/NISO Z39.48-1992 (Permanence of Paper).

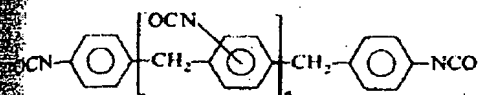
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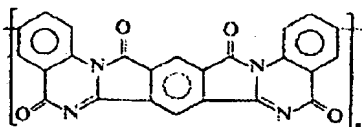
POLYKETAL

are of interest as replacements for rigid polyurethane foams because of their much better fire resistance. They are produced by the use of a polymeric MDI,



with  $n$  having values of 2-7, and a trichlorofluoromethane blowing agent. The products are necessarily highly crosslinked and somewhat brittle, so frequently polyisocyanurate-polyurethane combinations are used. Isocyanurate ring-containing polymers are also produced by a side reaction when 1,2-epoxides are reacted with diisocyanates to yield poly-(2-oxazolidines). Alternatively, amide-modified PIR (using a carboxylic acid, such as a dimer acid) or carbodiimide-modified PIR (by catalysing a condensation reaction of isocyanate groups) may be used to improve toughness.

**polyisindoloquinazolinone** A polymer of structure:

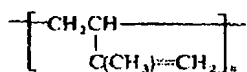


synthesized by reaction between an aromatic diamine and an aromatic bis-(o-amino-amide) in PPA. The reaction proceeds via soluble uncyclized precursor polymers. The polymers have good thermal stability.

**polyisindoloquinazolinone** Alternative name for *polythioquinazolinone*.

**polyisoprene** (*poly*-(2-methyl-1,3-butadiene)) A polymer of isoprene which can exist in any of several stereoisomeric forms. The commonest form is *cis*-1,4-polyisoprene which occurs in the latex of many trees and plants as natural rubber. *Trans*-1,4-polyisoprene can also be isolated from some plants as balata or gutta percha. Both of these forms may also be synthesized by the use of a stereospecific catalyst in anionic polymerization. 3,4-Polyisoprene may also be synthesized and can exist in both syndiotactic and isotactic forms. A further isomer is 1,2-polyisoprene. In addition to these regular structures, more than one different isomer may be present in the polymer, notably when it is prepared by free radical polymerization. This generally results in poorer mechanical properties as found in the early synthetic polyisoprenes. Natural rubber is probably 100% *cis*-1,4-structure and although synthetic *cis*-1,4-polymers with *cis* contents of more than 90% are made, the difference in properties is significant.

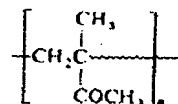
**1,4-polyisoprene**



An isomeric form of polyisoprene of little interest compared with the 1,4-isomers. Produced, with about 90% 1,4-structures, by Ziegler-Natta polymerization using a

homogeneous catalyst system consisting of aluminium triethyl and a titanium alkoxide with an Al/Ti ratio of about 6. The polymer produced does not have sufficient order at asymmetric centres to crystallize and is therefore amorphous.

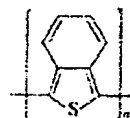
**poly-(isopropenylmethyl ketone)** (*polymethylisopropenyl ketone*)



Readily produced by the free radical, cationic or anionic polymerization of isopropenylmethyl ketone. The polymer has a  $T_g$  value of about 80°C and is similar to polymethylmethacrylate in its physical properties, except that it has poor thermal and photochemical stability. Useful as a positive photoresist material.

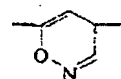
**poly-(4,4'-isopropylidenediphenylene carbonate)** Alternative name for *bisphenol A polycarbonate*.

**poly-isothiannaphthalene** A polymer of structure



and therefore related to poly-(3,5-thienylene), which is a good electrical conductor when doped.

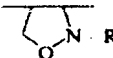
**polyisoxazole** A polymer containing the heterocyclic ring



in the polymer chain. Formed by 1,3-dipolar addition between a dinitrile-*N*-oxide and a diacetylene. Closely related polyisoxazalines containing



rings (obtained from a dinitrile-*N*-oxide and a diolefin) and polyisoxazolidines containing



rings (obtained from 1,3-dipolar addition of a dinitrile to a diolefin) are also known, but only in low molecular mass form.

**polyketal** A polymer containing ketal units of the type  $-\text{O}-\text{CR}_1\text{R}_2-\text{O}-\text{R}-$ . Formed by reaction of a diol with a ketone:

